

原 著 論 文

Distress of Community Residents after the Radiation Disaster at the Great East Japan Earthquake in Fukushima Prefecture

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Abstract

Aim: This study describes and identifies the difficulties and stressors for the people living in evacuation facilities since the Fukushima Daiichi Nuclear Power Plant accident. Based on findings, this study contributes to provide appropriate nursing care for victims of the nuclear accident.

Method: The elderly group with those over 65 years in age and mothers with young children group in Village A in Fukushima Prefecture were interviewed about difficulties they have faced as evacuees in 2015. Interviews were conducted in a semi-structured format, and the data were analyzed based on phenomenological approach.

Result: As the characteristics of radiation disaster in Fukushima, the interviews revealed eleven “difficulties” that were categorized into 1) Hardship caused by the changes in life situations, 2) Consequences of prolonged evacuation on physical and mental health, and 3) Emotional complication about monetary compensation. The two groups showed both similarities and differences in the items of difficulties.

Conclusion: Research participants showed physical and psychological burdens imposed on them by the decision-making stressor due to uncertain future, family dispersal, restrictions on everyday activities, and complexities from monetary compensation. To establish systems for psychological and physical security of radiation disaster victims, adequate information dissemination and motivating decision-making power by the victims are essential.

Keywords : distress, radiation disaster, community resident, Fukushima Prefecture

Introduction

On March 11, 2011, an earthquake of 9.0-magnitude struck the east coast of Japan. Fukushima prefecture was affected by the Fukushima Daiichi Nuclear Power Plant accident which was caused by the tsunami after the earthquake. The number of disaster-related deaths was 2,238 in Fukushima as of July 5, 2018 (Fukushima Prefecture, 2018). “Disaster-related deaths” are those caused by exhaustion or deterioration of conditions related to chronic diseases. Disaster-related deaths in the recovery phase in the Fukushima Prefecture exceeded the number of deaths (1,829) by the direct impact of the earthquake and tsunami (Fukushima Prefecture, 2018). In addition, altered lifestyle and the living environment due to the radiation have

become an issue.

Seven years has passed since the Great East Japan Earthquake, yet 44,878 residents from Fukushima Prefecture still remain as evacuees (Fukushima Prefecture, 2018). Although the national and local governments decided to allow some evacuees to return to former residences, the anxieties about radiation still remain unresolved. Residents of Fukushima have been deeply concerned about the effects of radiation. Even though they have been informed about scientific standards for safe radiation levels, the evacuated residents have not been reassured that it was safe to live in Fukushima Prefecture (Niwa, 2012). So there is a gap between safety by scientific standards and the security which residents feel about radiation.

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Village A, located 40 km away from Fukushima Daiichi Nuclear Power Plant, was considered dangerous to live after the earthquake due to its proximity to the Plant, and its residents were relocated to apartment assigned by the government or a temporary housing complex situated outside of the village in June 2011. About 75% of the Village A was forest areas wherein many farmers and ranchers used to work. Most of the residents used to live in a large house before the disaster; by 2015 they were all relocated to a small temporary housing or fukko jutaku (reconstruction housing for victims). They have lost their land, homes and livelihood; they live in separation from their family and neighbors. According to researchers like Yabe et al. (2014) and Uchiyama et al. (2013), evacuees felt anxious and stressed about life in evacuation and an uncertain future.

Vulnerable populations, including children and elderly, are most impacted by disaster situations (Allen, 2010). Children are impacted by radiation at a greater level than adults (UNSCEAR, 2013); the elderly struggle to adapt to sudden changes in daily lives. The elderly desired strongly to return to their previous houses and lands which are connected to their ancestors (Ishikawa, 2013). Yet the effects of living in prolonged evacuation since the nuclear accident have not been clearly identified.

This study aims to describe and identify the difficulties and stressors arising from living in evacuation among the mothers with young children and the elderly of Village A. The findings of this study will contribute to provide appropriate nursing care for victims of the nuclear accident. Definition of “life in evacuation” in this paper refers to the situation in which the residents from Village A had to relocate and be displaced while having to face drastic changes in living conditions unwillingly due to an evacuation order from the government.

Methods

A total of nine participants, composing of four mothers with young children under the age of 7 and five elderly people over 65 years in age, were selected for this study. Three of mothers were recruited at the Child-rearing Support Salon,

and others were recommended by the public health nurse in Village A. The participants are assigned to generic names to protect their identity. See Table 1 for more detailed information on participants.

Table1. The research participants' profiles.

	Subject		Type of interview
Mothers	A	20-40 years old Have more than one young children	Group
	B		
	C		
	D		Individual
Elderly	E	65-80 years old, Female	Individual
	F	65-80 years old, Female	Individual
	G	65-80 years old, Female	Individual
	H	65-80 years old, Male	Couple
	I	65-80 years old, Female	

Semi-structured interviews were conducted. Questions to both the mothers group and the elderly group asked about changed life situations since the earthquake and difficulties they faced as evacuees. Interviews were recorded on an IC recorder with the participants' permission. All interviews were conducted in the month of October in 2015.

The narrative data of interviews were transcribed and analyzed based on phenomenological approach by Dickelman et al. (Holloway & Wheeler, 2002). The data analysis process took place as the following: 1) Reading narrative data for a holistic understanding, 2) Writing interpretive summaries and searching for potential themes, 3) Identifying the flow of context and the meaning of narration and extracting the thematic categories, 4) Returning to the narrative data to clarify confusing issues, and 5) Categorizing the themes on a time-based continuum starting with the disaster.

This study was approved by the Ethics Committee of the University of Kochi. Informed consent, right to withdraw, and anonymity were consented by the participants and strictly preserved by the researcher.

Results

A total of eleven different themes describing the types of distresses were identified as the characteristic sufferings of the radiation disaster victims in evacuation. These themes were grouped into 3 larger categories (See Table 2). There were similarities and differences between the two

participant groups. The first category was the hardship originating from changed life situations. The second category was physical and mental consequences of the evacuation on the victims, and the third was related to monetary compensation. The themes are organized in Table 2 below with specific textual data for thicker description.

Table 2. Difficulties identified by the nine of the former Village A residents: 11 themes grouped into 3 categories.

Category	Theme
1) Hardship caused by the changes in life situations	Bewilderment by a nuclear accident in the village which has no relation with the nuclear power plant
	Unexpectedly prolongation of life in evacuation
	Impact of evacuation on everyday life
	Vexation and resignation from the dispersal of the family
	Impact of family dispersal on children
	Hesitation and conflicts in decision-making
2) Consequences of prolonged evacuation on physical and mental health	Negative impact from limited outdoor activities among mothers and children
	Lack of diversion
	Adverse impact of evacuation on physical health
3) Emotional complication about monetary compensation	The pain of the slander by non-evacuees
	Gap in normalcy of life

1) Hardship caused by the changes in life situations

This category describes the difficulties residents faced due to changes in everyday life conditions during the period between immediately following the nuclear accident in 2011 to the time of this study in 2015. Six extracted themes describe particular difficulties of radiation disaster more in detail.

1.1 Bewilderment by a nuclear accident in the village which has no relation with the nuclear power plant

The participants, who had no relation to the destroyed nuclear power plant until the disaster, felt bewildered by the impact of a nuclear accident in their village.

Mother B: *"I couldn't understand what happened*

because our village was quite far from the nuclear power plant. It took a long time to understand the seriousness of the situation."

This bewilderment was shared by all residents.

Elderly G: *"We had lived [in the village] for a long time with a lot of nature around us and had never gotten the benefit from the nuclear power plant. I didn't know the radiation was dangerous, and I didn't regard this accident as serious."*

At the time of the accident, the Village A residents didn't know about the social and personal impact of the nuclear accident. Nor were they aware of its scale and gravity. Although they knew the nuclear power plant exploded, they couldn't fathom their life would be later impacted to its extent.

1.2 Unexpectedly prolongation of life in evacuation

Immediately following the nuclear accident, participants were evacuated from Village A and were in confusion. Having to move out of their homes and live in a temporary housing for an unknown period of time seemed to be confusing to the residents. The elderly, in particular, had never expected such a prolonged period of liminal stage of life when they relocated.

Elderly G: *"I never dreamed that I would be here for five years. I heard two years was the standard. I was told that this room was vacant, so I thought nothing about coming and evacuating to this [apartment]. I didn't look this room over before moving in. I would have liked to have known about the small and bad the living conditions before coming here."*

The elderly said that they decided to move to the current temporary housing complex but never expected such a long period in relocation. Especially, as seen in the above anecdote, Elderly G implied that she would have made a different decision about evacuating had she known the evacuation would extend to unknown future.

1.3 Impact of evacuation on everyday life

The Village A's residents had to make a decision whether to move out of their village or not in confusion. Mothers of this study expressed that they not only had to figure out and understand about the nuclear accident but also they needed decision-making ability or/and mobility as well as economic power to move out of the disaster struck areas.

Mother A: *"Some of my daughter's classmates from the kindergarten had moved away shortly after the earthquake. We haven't seen some of them since. This was a big difference between those who moved away and those who stayed. They had knowledge and energy to move, but we didn't understand the situation and couldn't leave, so we stayed. We have floundered about our children's school in the future. But [those who moved] have settled elsewhere. I think they are smart."*

Mother B: *"It was related to the economic condition of the family. The saving was*

needed, and cash was important [for moving away]."

In the background of decision-making to evacuate was each family's basic life situations such as job or economic condition. Currently, the mother participants have had problems with their children's school because they could not make the decision to move away after the disaster. On the other hand, study participants thought that there were some other residents living calmly because they could make the decision to move away after the disaster. The mother participants compared their own situations with those who moved away and felt frustration and regret.

1.4 Vexation and resignation from the dispersal of the family

After the nuclear accident, almost all participants experienced dispersal of their family members. Especially, the elderly felt most deeply about dispersal of the younger family members.

Elderly G: *"There was no other way but to disperse, but I feel regret. Although my husband and I decided that we would stay in Village A as long as we could, I couldn't make our children and grandchildren stay in the village. I felt [dispersal] was inevitable."*

The elderly felt that it was an inevitable for the family to be dispersed, but they also felt frustrated. Simultaneously, they felt they had no choice but to accept the present situation.

1.5 Impact of family dispersal on children

A mother described their suffering caused by the dispersal.

Mother D: *"My children and I evacuated because of the impact of the radiation on children. They cried because they were separated from their father and they felt lonesome."*

Three generations had lived together in her family prior to the disaster. The children had been taken care of by all family members. Although the evacuation allowed the children to avoid and be safe from the radiation exposure, they were separated from other family members. The mother felt that her children were lonesome, and that the evacuation imposed psychological burdens on her children.

1.6 Hesitation and conflicts in decision-making

After the disaster, the participants faced decision-making dilemmas in various aspects, such as whether to evacuate, relocate, how to make living, and everything involving daily routines. Mothers made their decisions based on what they thought would be the best choices for their children. Yet they were unsure whether their decisions were actually the best ones. They were not sure whether they really understood the available options. There was an overflow of information, and the participants did not fully understand the given information.

Mother A: *"I don't know what the best choice would have been. I thought about what would be the best choices for my children, but the list of options was endless. I felt confused when I saw other mothers choosing other options."*

The mothers doubted whether each of their decision would lead to the right or intended result. Additionally, the mothers were conscious about other people making different choices from their own which made these mothers question their decision-making abilities, despite their intent to do the best for their children's future. Overall, they felt lost and conflicted about making decisions because they could not be absolutely sure about the consequences. Yet, these mothers were put in a position to make decisions for their families, and the pressure from having to make decisions for an uncertain future caused them additional emotional stress.

2) Consequences of prolonged evacuation on physical and mental health

This category focuses on both physical and psychological health problems arising from living in evacuation housing for a prolonged period.

2.1 Negative impact from limited outdoor activities among mothers and children

After the Village A planned an evacuation in June 2011, mothers moved to the apartments immediately. They talked about how that changed their life situations and impacted their families.

Mother D: *"Before the disaster, I used to tell my children to play outside. But now I cannot. It was very hard on both me and my children, and we quarreled with each other. After*

the nuclear accident, there were only a few children to play outside with. [My children] hardly got any exercise and could not move around inside because [the apartment] was too small. But they have been eating normally, so they gained weight."

Mothers felt that the time spent inside the apartment was stressful for all family members. Additionally, they were worried about decreased activity level and the weight gain. Before the disaster, mothers could encourage their children to play outside, but in the current living situation, that was not possible. They recognized the adverse impact of living in evacuation on their children.

2.2 Lack of diversion

All of the participating mothers and four of the elderly participants said that their current life was lacking in diversion. The words from Mother A and Elderly H illustrate this point.

Mother A: *"There is no fun every day. I sent a text message to my friend that I don't feel alive. I have nothing [entertaining] recently."*

Elderly H: *"My hobby is fishing, but I cannot do it now. So, I'm distressed. If I catch fish, I would not eat it. So, I don't want to go fishing. Fishing was a stress-relief activity for me."*

Some mothers answered that "there is little diversion" or doing something with their children was a kind of diversion. In evacuation, they have almost no means of entertainment, and they did not want to stay indoors for their children. The elderly used to enjoy the village's life surrounded by the nature before the disaster. So, it was difficult to find new diversions now in evacuation.

2.3 Adverse impact of evacuation on physical health

All of the elderly participants recognized that their health condition has been worsening, and they regularly went to hospital after the nuclear accident.

Elderly G: *"I have not slept well, so I took sleeping tablets. It is my way of life now. My neighbors said the same thing. It looks like nothing special, but there are a lot of stresses that are invisible."*

The elderly participants used to work in agriculture or forestry before the disaster. So, they

felt their leg muscles were weakening because the amount of exercise has been reduced after the disaster.

These cases were not only the elderly participants but also their neighbors, who expressed the similar complaints. The elderly thought that life in evacuation affected negatively on their physical health.

3) Emotional complication of monetary compensation

Evacuees from the Village A received monetary compensation from an electric company to rebuild their lives. This category of themes was focused on the distress study participants felt about the monetary compensation.

3.1 The pain of the slander by non-evacuees

Mothers and the elderly participants experienced slanders from other non-evacuees who lived in the same area. The following excerpts from the mothers illustrate this.

Mother B: *"People told me that it is good for me to get compensation, so I feel it is hard to live (with such attention)."*

Mother A: *"They cannot understand that we were ejected from our village and our house so that we could continue to live. Furthermore, our children's school problem still has not been solved. It was a big difference between us and [those who slander us]."*

Mother B: *"Although we have more money now and live in a city, the village's life is better for me. I get money, but [this is not about money], money is not the problem."*

Mother C: *"I want to return to the village's life." (crying)*

Mother B: *"Because life was really peaceful in the village."*

The elderly participants also said the same things as the mothers.

Elderly G: *"Although we get monetary compensation, we lost all our assets and we are now living in patience and with difficulties. I was told directly that they envied me because I get money and have leisure."*

Elderly I: *"We are thought to have a lot of leisure because we do not have a job now."*

The evacuees lost the peace of life and have been living in patience despite difficulties in their lives. They felt that they wanted to return to the village's life. They all shared the same opinion that the money was not the problem. They felt the pain from people's misunderstanding.

3.2 Gap in normalcy of life

Mothers expressed conflicted feelings about receiving monetary compensation. Before the disaster, most villagers were in the lower income class. The government began to disburse compensation in cash, and many of the evacuees now had disposable income and felt they could afford to buy material things. This sudden change in income level left them feeling confused and uncomfortable as they worried about the day the compensation would end.

Mother A: *"Actually the coffer has become fuller, and we were poorer [before the disaster]. Because of that the compensatory money, the value of money has changed."*

Mother B: *"My children got used to monetarily better life [since we began receiving compensation]. I am worried about the future. When the compensation money stops, can we change our sense of value? This life with more money was not by our intention, but it is reality. I do not work now, and I raise small children full time. If the nuclear accident didn't occur and we stayed in the village, my family could not make a living without my working every day." [Now my family can live without job because of the monetary compensation.]*

Mother C: *"I feel unpleasant that people think we can make a living without having to work due to the monetary compensation."*

Mother B: *"Although I feel grateful to receive the money, I don't want to be talked about by people around me. So, I don't know whether I should look for a job or not."*

As the evacuation continues on, the compensation money added a new kind of complication in that the evacuees were uncomfortable about the negative attention from the public as free-loaders and their growing habit of having more exposable income from the monthly compensation.

Discussion

Since the nuclear accident caused by the mega earthquake in 2011, the participants have continued to live in evacuation, which allowed them to live in a certain level of safety against radiation. However, the participants faced difficulties with daily life, and the life in evacuation could by no means be considered a secure one. This study brings about four points of discussion.

Firstly, uncertain future prospects and decision-making pressure based on this uncertainty continue on. As the decisions these evacuees made in confusion and under the threat of radiation exposure continue to impact their lives, the evacuees feel greater pressure about further decision-making. The radiation disaster forced the evacuees to make decision about various aspects of life. Making a decision while facing such uncertain future prospects is complicated by little or lack of understanding on the predicament of each decision. Having to make decisions begot doubt and anguish, and the difficulty in reaching a decision hinders the disaster victims from achieving a secure daily life. Psychological well-being could be compromised when instability in daily life persisted after a disaster (Motoya, 2013), and the above-mentioned uncertain future constituted a psychological burden on disaster victims. In this study, the mothers prioritized the wellbeing of their children as their highest priority when making a decision. Konishi (2011) stated that mothers worried that a mistaken decision on their part could have prolonged negative consequences for their children. Mothers in this study held the same perspective in that they felt a tremendous pressure about making decisions, which constituted a psychological burden.

Secondly, family dispersal caused psychological burden although to different extent. For mothers, the families dispersed due to the fear of radiation and to relocate their children to a physically safer location. It was confirmed that while life in evacuation afforded safety, it also constituted a burden on the children. This illustrates how simply acting to avoid radiation and achieve safety was not directly connected with a secure daily life for the family as a whole. In the case of the elderly participants, the pursuit of emotional stability was the most important concern, and generally

the elderlies exhibited a strong tendency to find a meaning of living through personal and social relationships with family and neighbors (Simpson & Lancaster, 1994). For the elderlies in this study, the distress of family dispersal that they experienced served as a major shock, jeopardizing their emotional stability and leading to a loss of purpose in life. It followed, then, that family ties could be thought of as an integral factor of a secure daily life.

Thirdly, the participants felt evacuation restricted them on everyday activities, yet the kinds of restrictions were different for the mothers and the elderly. The restrictions on outdoor activities were set in place at schools and other educational institutions, especially the years 2011 and 2012 (McCurry, 2012), and most families also limited their children's outdoor activities (McCurry, 2013). Under these circumstances, many parents in Tohoku felt that their children were being subjected to escalating levels of stress (McCurry, 2012), and the mothers who participated in this study expressed the same feelings. In addition, there were physical impacts such as increasing obesity and deteriorating physical strength and motor functions among children, which continue to be a problem (Fukushima Prefectural Board of Education, 2014). It is unclear how these restrictions on outdoor activities will manifest on the affected children's development (Kikuchi, 2013).

For the elderly, most of them were conscious of the declining activity levels in their current living situations in evacuation compared to before the disaster, and they understood the direct impact of inactivity on their physical health. Most of the elderly were also aware on the adverse impact of psychological ailments, such as stress, on their physical conditions. In fact, it has been pointed out that prolonged stress leads to a secondary deterioration of life functions, heightening the risk of physical ailments (Simpson & Lancaster, 1994). In this regard, the elderly participants were subject to deteriorating physical functions and pre-existing illnesses. Mental and physical capacities further declined due to the restrictions on everyday activities, leading to physical, psychological, and nervous disorders—a sluggishness in carrying out everyday activities,

that is termed “disuse syndrome” (Motoya, 2013). These problems further heighten the risk of depression and dementia (Allen, 2010; Kobayashi & Niwa, 2012). Particularly the prolongation of harm becomes the point of concern. It was clear they faced major psychological burdens due to stress and other factors, and there were few places for them to resolve their insecurities and stresses. As the length of time of life in evacuation is prolonged, questions have been raised about possible linkages of the occurrence of disaster-related death and the psychological burdens of the stress and other factors they faced (Hori, 2014). These considerations raise major concerns about the physical and psychological impacts associated with prolonged evacuation and ongoing disaster-related death.

Fourthly, the difficulties related to monetary compensation was one of the characteristics of the radiation disaster victims in evacuation. It has been reported that classifications in monetary compensation have produced discord between neighbors and has been one of the causes of ruptures within the community (Hasegawa et al, 2015). Nor was it the case that time and money were healing the wounds that the study participants suffered from the nuclear accident. Motoya (2013) stated that one factor contributing to the deterioration of the victims' psychological well-being lied in the situation wherein they suffered secondary harm. “Secondary harm” here refers to the indirect damage. Direct damage is the injuries which the victims suffer from the disaster itself. Indirect damage occurs when the victims are harmed by surrounding people or situations. In regard to monetary compensation, the mothers were confronted with the difficulty of bearing further psychological burden coming from verbal abuse and negative stances from non-evacuees in the relocated areas. The evacuees were aware of their unusual life circumstances of being dependent on monetary compensation and inability to live without it. However, monetary compensation complicated their sense of identity and value of money. They also felt helpless about these difficulties. This would imply that they faced major psychological burdens.

Implications for Nursing

The implications for nursing of this study brings forward are three folds. Firstly, it is necessary to put in place a system whereby support and follow-up for the disaster victims to be carried out at an ongoing basis. Mothers and the elderly who participated in this study continue to live with an uncertain future ahead. They have confronted a wider range of difficulties, including psychological and physical burdens. In epidemiologic surveys carried out after the Chernobyl nuclear accident, it was also posited that there were long-term impacts on the psychological health of disaster victims (Bromet et al., 2011). In addition, it is believed that ongoing changes in the social environment with regard to monetary compensation and evacuees' return to their former home villages would yet further impact the disaster victims' psychological health. For the elderly in particular, the impact of the prolonged psychological burdens, along with their pre-existing chronic illnesses, was of the greatest concern-including the issue of disaster-related death. Support for disaster victims' daily lives, including the maintenance and promotion of their health, is of the utmost importance.

The second is the information dissemination. Prefectural and national governments are currently putting systems for ongoing long-term follow-up, covering health and environmental issues in place by. In order for disaster victims to get health checks and be surveyed continually, there is a need to deliver the relevant information and after-support directly to them. Moreover, going forward, we can expect to clarify a wide range of issues through accumulating research and studies from within this kind of long-term follow-up system. The nurses in particular are in a position to provide the greatest possible amounts of health-related information to local residents in the disaster-affected areas. It is clear that the disaster victims must make a wide range of decisions while continuing to live their daily lives with uncertainty. Thus provision of accurate and appropriate information would be an important means to support the disaster victims in making decisions.

Finally, supporting these residents in disaster affected areas should be done through empathetic understanding. It has been clearly shown that

the victims experienced distress and confusion in decision-making processes, and that the complexities they face persisted even after any given decision has been made. It is important to empathetically draw closer to these victims' feelings, offering them support for any decision that they may make, in order for them to continue being in a position to make decisions for themselves.

Conclusion

The evacuees from Village A in Fukushima Prefecture have undergone difficulties in living their everyday lives. In addition, they have had physical and psychological burdens imposed upon them. To establish systems for psychological and physical security of radiation disaster victims, provision of information and empowered decision-making are essential.

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